XVII. *On the mode of generation of the lamprey and myxine.* By *Sir* Everard Home, *Bart. V. P. R. S.*

Read June 15, 1815.

THE observations contained in the preceding paper upon the organs of respiration of the lamprey and myxine, led me to doubt the propriety of classing these animals among fishes, and as their ovaria differ in many respects from those of fishes in general, I became desirous of knowing the structure of the testicles in the male, to see how far they resembled those of fishes, or in how great a degree they differed from them.

That the lamprey was male and female nobody seemed to doubt, and yet with every opportunity apparently before me, I was unable to procure one male. Sir JOSEPH BANKS supplied me very largely with lampreys and lamperns, those that were full of ova were admitted to be females, and those which appeared to have no ova were said to be males; but all of them had ovaria, although in some the ova were extremely small, requiring a magnifying glass to distinguish them, in others they had been shed, leaving the cells in which they had been contained, and the openings by which they passed out very apparent. Being accidentally at Worcester, in which city, during the season, lampreys are caught in the river Severn in great abundance, and potted to be sent all over England, I made

inquiry of the person whose business it is to prepare them for being potted, what were the differences between the internal parts of the male and female; he said, the only difference was, the one had no ova, the other had, in all other respects they were alike. He had never seen a lamprey in which there was no part corresponding to what I called ovarium. This remark from a person whose whole employment during the breeding season was to take out their viscera, corresponded so entirely with my own observations, that I began to entertain the opinion that the lamprey has not distinct sexes, but is an hermaphrodite animal. This doubt of their being male and female, was started in the beginning of the breeding season, and my friend Dr. WILSON PHILIP of Worcester, supplied me with lampreys at regular intervals, till the ova were shed, that I might prosecute this inquiry. I found upon examination, that the two glandular bodies projecting into the belly, one on each side of the ovarium, which have been always supposed to be the kidneys, varied very much in size and appearance at the beginning and end of the season. When the ova are so small that the animal is reputed to be a male, these glandular bodies and the black substance upon which they lie appear to form one mass, and the duct upon the anterior part is thin and almost transparent, containing a fluid equally so, but in the end of May, when the ova increase in size, these glandular bodies become larger, more turgid, and have a distinct line of separation between them and the black substance behind; their structure is more developed, being evidently composed of tubuli running in a transverse direction, and the ducts leading from them are thicker in their coats and larger in size.

On the 5th of June, the ova were found to be of the full size, and a small transparent speck not before to be observed was seen in each; at this time the tubular structure had an increased breadth, and the duct going from it contained a ropy fluid, which when examined in the field of the microscope, was found to be composed of small globules in a transparent liquid.

On the 9th of June, neither the ova nor the tubular structure had undergone any change.

On the 11th, the ova were of the same size, but the slightest force detached them from the ovarium, the tubular structure had increased still more in size, the fluid in the ducts was thicker, more ropy, and when water was added to it in the field of the microscope, it coagulated, and what was before made up of globules, had now the appearance of flakes.

As these specimens had been kept two days, and had been carried 120 miles before they were examined, the appearance of the tubular part was seen under a disadvantage; but I was so fortunate on the 12th of June, as to receive from Sir JOSEPH BANKS, the viscera of two lampreys caught in the river Thames, one of which had shed its ova, the other just ready to do so. In this last, the tubular structure from being in a more recent state was very distinct, and the difference in texture and appearance, between it and the black substance behind it, was more strongly marked. It is from this specimen that the annexed drawing was made, (Pl. XIV.) in which the black part is seen to have a reticulated texture. As it runs up as high as the heart, and may be said to lie principally behind the peritonæum, which is both the course and situation of the kidney in fishes, there can be no doubt that it performs the office of

that gland, while the tubular bodies which project into the cavity of the abdomen, and are increased to double their usual size at the time of shedding the eggs, must be considered as the testicles.

The ova in the lamprey do not pass out at an excretory duct as in fishes, but drop from the cells in the ovarium in which they were formed into the cavity of the abdomen, and escape by two small apertures at the lower part of that cavity into a tube common to them and to the semen, in which they are impregnated.

This mode of impregnation is so much more economical than that employed in fishes, that it explains the circumstance of the testicles being so small.

In the animal, intermediate between the lamprey and myxine, and in the myxine, the organs of generation have the same structure as in the lamprey.

EXPLANATION OF PLATE XIV.

Fig. 1. A lamprey of the natural size laid open, to show the ovarium at the time the eggs begin to be shed, some of them lying loose in the cavity of the belly, others remaining in the cells of the ovarium in which they were formed.

On each side of the ovarium is seen a glandular body projecting into the cavity of the belly, which I have explained to be the testicle. It is made up of tubes placed in a transverse direction; behind it is a substance composed of a reticular

texture, which extends higher than the testicle; this I consider to be the kidney. On the forepart of the testicle is the duct or vas deferens; this is laid open at its termination to show that it forms, with the opening into the belly, a common cavity just within the verge of the anus.

Fig. 2. A portion of the ovarium and testicle of the natural size, when the ova are beginning to enlarge.

Fig. 1.

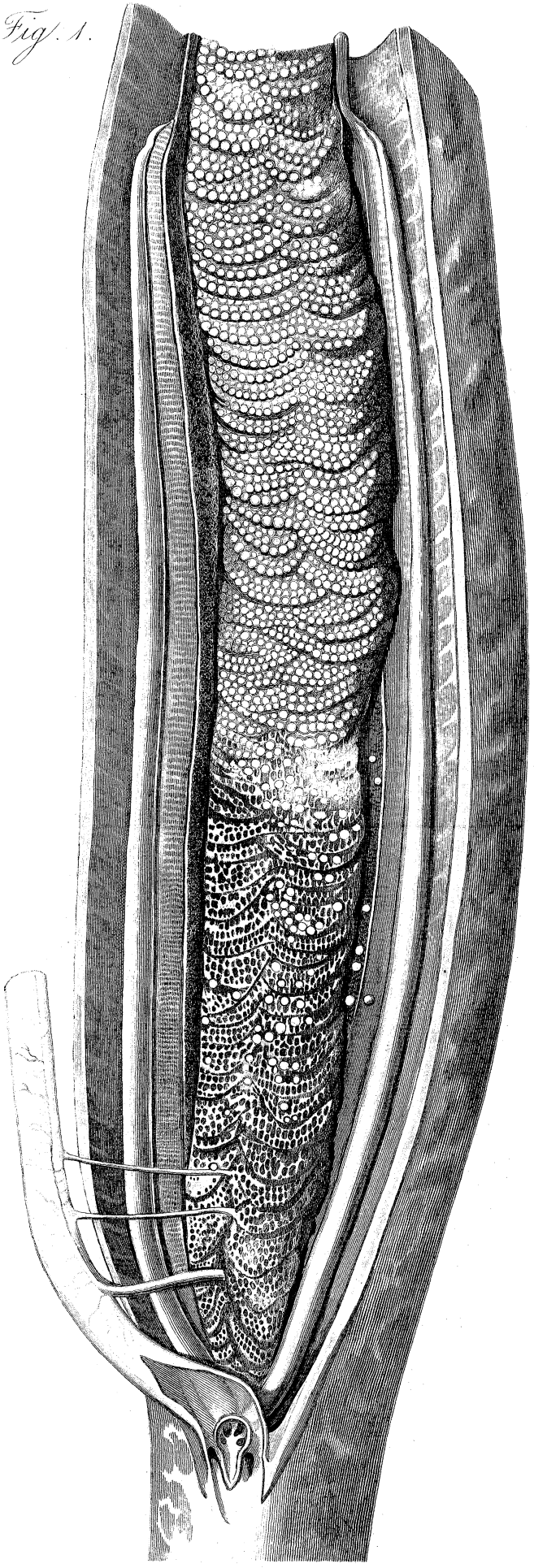

Fig. 2.